

APPENDIX T

**DEBRIS PLANS FOR LOCAL
GOVERNMENT**

APPENDIX T – Debris Plans for Local Government

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EXAMPLE

Debris Management Plan

For

Date: _____

Prepared by: _____

Approved by: _____

Introduction and Purpose

To provide policies and guidance to the agencies of _____ County\City for the removal and disposition of debris caused by an event and/or a major disaster.

To facilitate and coordinate the management of debris following a disaster in order to mitigate against any potential threat to the health, safety, and welfare of the impacted citizens, expedite recovery efforts in the impacted area, and address any threat of significant damage to improved public or private property.

Staff Roles and Responsibilities

Staffing Resources: *In a major or catastrophic disaster, our government may experience difficulty in locating staff, equipment, and funds to devote to disaster debris management. The following positions represent potential staffing assets suitable for assignment to our debris management team. (Note – delete or add positions to represent your available assets)*

Mayor or Chairman of the Board of County Commissioners

City Manager or County Manger

Director of Public Works or County Road Superintendent & Staff

Emergency Manager & Staff

Superintendent of Parks and Recreation & Staff

Superintendent of Solid Waste Department & Staff

City or County Purchasing Director & Staff

Director of Utilities Department & Staff

Director of Public Health Department & Staff

Director of Finance Department & Staff

City or County Engineer

Key Staffing Requirements – Roles & Responsibilities

1. Debris Manager (Incident Commander)

Develops incident objectives and approves resources (task orders) during the response phase. The role of the DM may be as more of a support agency during the phase. Key tasks include:

- Provide overall incident objectives and strategy.
- Establish procedures for incident resource ordering.
- Establish procedures for resource activation, mobilization, deployment and employment.
- Approve completed task orders.
- Provide overall project management.
- Assist in developing safe tactics.

2. Deputy Debris Manager

The Deputy DM acts as extension of the DM in the event that the DM is unavailable. The Deputy DM may be called upon to advise the DM on various FEMA reimbursement issues, eligibility issues or attend FEMA debris meetings on the DM's behalf. The Deputy DM may be identified within our staff or retained through a contract with an individual or firm.

3. Planning

The Planning Section Chief acts as the mechanism for tracking resources and identifies resource shortages during the response phase. This includes the following tasks:

- Conduct Planning Meetings with internal staff and FEMA Public Assistance Officer (PAO).
- Coordinate preparation and documentation.
- Conduct detailed damage assessments.
- Identify debris project tasks
- Assist procurement/legal with scope of work development if necessary

4. Finance/Administration

The Finance/Administration section of the team pays for the resources and reports the costs. These tasks may include:

- Provide cost estimates.
- Ensure that the task orders are within the financial limits
- Attend contractor pre-planning meetings.
- Track costs.

5. Operations

The Operations Section Chief works to identify, assign, and supervise the resources needed to accomplish the debris mission. During the response period of the incident, the Operations Section Chief's tasks include:

- Assist in identifying operational strategies.
- Determine tasks necessary to achieve mission success.

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- Determine work assignments and resource requirements.
- Provide project management.

6. Legal

The Legal Team provides legal sufficiency review of all contracts and agreements associated with the debris mission.

Emergency Communications Plan: *Communications in advance of and immediately following the disaster will comply with preexisting telephone “Call Out” notification procedures established for each office and department within our government.*

D. Health and Safety Plan & Procedures: The health and safety of our citizens, the disaster response team, and the debris management team are of paramount importance. Managing the safe execution of the debris management mission is a responsibility of all involved. Contractors will be required to prepare Safety Management Plans for the protection of all persons and property.

E. Training Schedule: Training should be completed in a non disaster environment to facilitate a more effective and efficient response. The following courses are recommended for all team members associated with our Disaster Debris Response Team:

FEMA G-202 course on Debris Management
ICS-100 through ICS-400
EMI FEMA Independent Study 632.

Situation and Assumptions

A. Disaster Event: The amount of debris that is generated by an event can be estimated by several methods. One method is to accomplish a drive-through “windshield” damage assessment and estimate the amount of debris visually with the drive through. Another method that can be used is an aerial assessment by flying over the area using _____ State Police (___SP) and/or _____ National Guard (___NG) helicopters and Civil Air Patrol (CAP) reconnaissance flights. The damaged area can be assessed either visually or using aerial photography. Once the area has been assessed, the amount of debris may be estimated using a modeling methodology that was developed by the US Army Corps of Engineers (USACE) Emergency Management staff using actual data from Hurricanes Frederick, Hugo, and Andrew.

B. Debris: The debris may be equally heavy in both urban and rural areas depending on the magnitude of the tree blow-down and associated structural damage such as homes, businesses, utilities, signs, etc. Debris removal, regardless of source, becomes a high priority following a disaster as it is a visible sign of action and helps to restore a sense of normalcy to a shocked and stunned population. Removal often represents the first visible step towards recovery. In developing a management strategy for our debris removal operation, the operation should be divided into two phases. **Phase I** consists of the clearance of the debris that hinders immediate life saving actions being taken within the disaster area and the clearance of that debris which poses an immediate threat to public health and safety. **Phase II** operations consist of the

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removal and disposal of that debris which is determined necessary to ensure the orderly recovery of the community and to eliminate less immediate threats to health and safety.

Debris Collection Plan

Priorities:

Emergency Roadway Debris Removal (Phase I Response Operations).

There is an immediate need to open emergency access routes into devastated areas following any type of major natural disaster. ____DOT and local governments must identify routes within their jurisdiction that are essential to emergency operations.

Roadway debris removal involves the opening up of arterial roads and collector streets by moving debris to the shoulders of the road. There is no attempt to physically remove or dispose of the debris, only to clear key access routes to expedite:

- Movement of emergency vehicles.
- Law enforcement.
- Resumption of critical services.
 - Assessment of damage to key public facilities and utilities such as schools, hospitals, government buildings, municipal owned utilities.

c) The requirement for government services will be increased drastically following a major natural disaster. Therefore, after emergency access has been provided to hospitals, police, and fire stations, the next priority is to open access to other critical community facilities such as municipal buildings, water treatment plants, wastewater treatment plants, power generation units and airports.

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d) Damaged utility systems, structurally unstable buildings and other heavily damaged public facilities must be expeditiously repaired, deactivated, barricaded, or removed. Activities involving these facilities should be closely coordinated with their owners and/or operators. Demolition of unsafe structures, which constitute a public health and safety threat in most situations, may be deferred if access to the area can be controlled.

Emergency management and road / street personnel should be aware of local, State and Federal capabilities to provide service for emergency roadway debris removal. Available resources include:

- *Municipal workers and equipment*
- *Local and State DOT workers and equipment*
- *National Guard*
- *Local contractors hired by local and/or State governments*
- *US Department of Agriculture (USDA) Forest Service chain saw crews*
- *Local US Army Corps of Engineers (USACE) workers and equipment*
- *Department of Defense (DOD)*
- *Regional contractors hired by the Federal Emergency Management Agency (FEMA) or the USACE*

2. Public Right-of-Way Debris Removal (Phase II Recovery Operations).

a) As the major storm event approaches the **City / County**, Department of Public Works will be in contact with the contractor firm holding the executed and in-place Disaster Debris Removal, Reduction, Recycling and Disposal Contract to advise them of impending conditions. This contract is designed to remove and lawfully dispose of all natural disaster generated debris, and hazardous materials. Debris removal will be limited to **City / County** streets, roads and other rights-of-way, all municipal and public school properties, and any other municipal facility or site as may be directed, and includes all private residence and property debris brought to the edge of the right-of-way by citizens.

b) Debris is simply pushed to the shoulders of the roadway during the emergency opening (Phase I) of key routes. There is little time or concern for sorting debris at that time. The objective is to provide for the safe movement of emergency and support vehicles into and out of the disaster

area. As removal operations progress, the initial road side piles of debris become the dumping location for additional yard waste and other storm generated debris such as construction material, personal property, trash, white goods (refrigerators, washers, dryers, hot water heaters, etc.), roofing, and even household, commercial, and agricultural chemicals. Obtaining good estimates of debris volumes facilitate efficient debris removal, reduction and disposal work during this phase of operations.

c) Expedient removal of debris from in front of residents' homes should become a priority since it is a positive sign that restoration actions are underway and may help counteract depression and helplessness of the affected residents. The removal operations will also assist in expediting the replacement of key utilities located along public rights-of-way.

Specific actions may include:

- Assigning our staff to debris hauling assistance
- Activating debris removal contracts
- Debris collection and removal
- Opening of TDSRS locations
- Establishing residential debris drop sites
- Communicating curbside sorting instructions to the citizens

e) The general concept of disaster debris removal operations developed by the City / County includes multiple, scheduled passes of each site, location or right-of-way. This manner of debris removal allows citizens the opportunity to return to their properties and subsequently bring all debris to the edge of the right-of-way for City / County contractor removal, as property restoration progresses.

3. Pre-Positioned Debris Monitoring Firm and / or Force Account Monitoring

a) The debris monitoring is a third-party, objective, oversight agency acting as an extension of our staff to ensure that debris removal, reduction, and disposal activities are conducted in a manner consistent with FEMA rules and regulations. The monitoring firm will only be engaged upon activation of our contracted debris hauling firm.

b) The monitoring firm will orient employees with operational procedures and refresh staff with a field training program on current debris removal eligibility, FEMA eligibility requirements, debris removal contract requirements, and safety procedures. Collection monitors must carefully document debris collection information to demonstrate eligibility and ensure proper debris hauling contractor payments and FEMA reimbursement. The debris monitoring firm may be responsible for the following activities:

- Issuing load tickets
- Verifying the amount of debris hauled to the TDSRS

- Identifying HHW on the ROW and at TDSRS locations and ensuring that it is properly segregated, and disposed of at a licensed facility
- Managing an extensive database for reimbursement, invoice reconciliation and auditing purposes
- Reviewing and reconciling contractor invoices prior to recommending payments to the City / County.

V. Debris Management Sites

A. Site Planning & Establishment

1. The City / County has pre-designated ____ sites totaling ____ acres for the sole purpose of the temporary storage and reduction of clean woody debris. These sites are known as Temporary Debris Storage and Reduction (TDSR) sites. No other debris operations are authorized on these sites.
2. As these sites were identified and investigated for disaster debris operational use, block diagrams of expected use configuration were prepared. These plans, along with the overall debris management program, were presented to and reviewed by the _____ Department of Environmental Quality. As a result of this advance coordination, all of the environmental concerns were identified and addressed and permit requirements established. This will ensure continuous operation, without interruption, upon site activation. Established baseline and closure environmental testing requirements and a general operation plan have been prepared and are part of our pre-positioned debris management contract.

B. Site Operations

1. Any hazardous and industrial materials encountered by the debris removal contractor are to be set aside at the point of collection for removal and disposal by the specialized debris crews. Any hazardous and industrial material arriving at the TDSR site(s) should be contained in the specially designed lined area until removed for disposal at the appropriate facility.
2. Site preparation activities include:
 - Developing a site management plan following FEMA Publication 325
 - Maintaining flag-persons and traffic control signage as needed to ensure safe traffic flow
 - Ensuring that the contractor's site health and safety plan is followed
 - Providing portable toilets (male and female)
 - Providing an all weather inspection tower
 - Providing dust suppression equipment
3. Debris Reduction options include:
 - Air curtain Incineration of clean vegetative debris
 - Open Burning of clean vegetative debris

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- Grinding vegetative and C&D debris

4. Recycling: Recycling reduces mixed debris volume before it is hauled to a landfill. Recycling is attractive and strongly supported by _____ since there may be an economic value to the recovered material if it can be sorted and sold. A portable Materials Recovery Facility (MRF) should be set up at the site. Metals, weed and soils are prime candidates for recycling. The major drawback is the potential environmental impact of the recycling operation.

5. Environmental Considerations: Stockpiled debris will be a mix of woody vegetation, construction material, household items, and yard waste. HHW and medical wastes should be segregated and removed prior to stockpiling. Activities at the debris disposal sites will include some, or a combination of the following activities: stockpiling, sorting, recycling, burning, grinding, and chipping. Burning is done in pits fed by an air curtain and generally only woody debris is burned; however, the efficiency of the burn and the quality of burn material is highly variable. Contamination may occur from petroleum spills at staging and reduction sites or runoff from the debris piles, burn sites, and ash piles.

6. Site Closeout: Each temporary debris staging and reduction site will eventually be emptied of all material and be restored to its previous condition and use. Contractors would be required to remove and dispose of all mixed debris, construction and demolition (C&D) debris, and debris residue to approved landfills. Quality Assurance (QA) inspectors should monitor all closeout and disposal activities to ensure that contractors complied with contract specifications. The basic close-out steps required are: remove all debris from the site; conduct an environmental audit/assessment, develop a remediation/restoration plan, approved by the appropriate environmental agency; execute the plan; get acceptance from the landowner; and terminate lease payments, if applicable.

VI. Contracting Considerations:

A. The **City / County** will implement their Emergency Contracting / Procurement Procedures to facilitate faster delivery of necessary goods and services to the disaster response.

B. Debris management requirements not covered by our pre positioned debris removal contract, debris monitoring contract, and hazardous waste disposal contract will be accomplished using force account labor or procured using Emergency Contracting Procurement Procedures.

C. General Contract Provisions and contract format for any new procurement action will comply with the guidelines and recommendations as published in Chapter 2 of FEMA 325, Public Assistance Debris Management Guide.

D. Qualifications Requirements will be used to pre qualify apparent successful contractors prior to any contract award.

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E. Solicitation of Contractors will be accomplished in a full, fair and open competition as discussed in Chapter 2 of FEMA 325, Public Assistance Debris Management Guide. Private Property Demolition and Debris Removal

- a. **Condemnation:** *To avoid significant building demolition problem we anticipate having ordinances in effect to handle emergency condemnation procedures. Due diligence is needed to prevent structures from being misidentified or have people or belongings in them when the demolition crews arrive. Buildings may be occupied by drug users or homeless people who will necessitate removal by our local law enforcement officials. Close coordination is essential and it is recommended that at least one FEMA staff person be on site to work directly with our staff to ensure that all required legal actions are taken.*
- b. **Mobile Home Park procedures:** *A catastrophic disaster may require temporary housing that cannot be provided by our local or State agencies. If Direct Federal Assistance is requested and approved, FEMA may provide mobile homes on a temporary basis under the Individual Assistance (IA) Program. FEMA's IA managers must obtain suitable locations to place FEMA mobile homes to provide temporary shelter expeditiously. Local mobile home parks will be surveyed and arrangements made with park owners for FEMA to clear the parks of debris in return for the park to lease pads for FEMA mobile homes. The local emergency manager will need to closely coordinate with his/her counterpart in the FEMA IA office to assist in possible clean-up activities and to enforce condemnation procedures. The debris removal mission must strive to retain the existing undamaged utility hookups. Legal aspects as well as health and safety concerns will have an important impact on the debris removal activities.*
- c. **Navigation Hazard Removal procedures:** *The emergency manager will need to coordinate with the USACE, the U.S. Coast Guard, State Marine Patrol, local government agencies, legal counsel, contractors specialized in marine salvage operations, commercial divers, and certified surveyors to ensure that navigation hazards are removed by the appropriate agency safely and efficiently.*

VII. Public Information Plan

- a. **Public Information Officer:** *Our public information strategy will assign the following tasks to a key management member of our Debris Team:*
 - Prepare information to be distributed
 - Process to distribute the information
 - Process to update, correct, revise, and redistribute information as operations progress
 - Establish a debris information center (toll free hot line) or a venue to address all concerns, questions, and complaints.

- b. *Pre-scripted Information:*** *The debris mission information should include the parameters, rules, and guidelines of debris operations so residents can begin their personal recovery activities. The staff responsible for developing and writing the information will present the information in a clear, direct, and organized manner. The language used must be simple and easy for all residents to understand. Information may have to be distributed in more than one language for it to be understood by non-English-speaking populations and neighborhoods.*
- c. *Distribution Plan:*** *The public information strategy is to disseminate the prepared information to the general public. This can be accomplished in a number of ways:*
- Media – Local television, radio, newspapers, or community newsletters.*
 - Internet Site – Applicant website and debris information flyers for printing*
 - Public Forums – Interactive meetings at town hall or shopping mall kiosks*
 - Direct Mail Products – Door hangers, direct mail, fact sheets, flyers within billings, and billboards.*

The public information staff will take advantage of every information vehicle available if power, utilities, and other infrastructure have been damaged. Many times the best carriers of information are the responders in the field. The general public recognizes their role and frequently asks questions regarding the operations. Stocking the equipment and trucks with flyers, pamphlets, and other print media allows responders to perform their duties while also satisfying the public's need for information.

VIII. Appendices

- a. ***Maps of Jurisdiction and Priority Clearance areas***
(to be inserted by user)
- b. ***Staffing Assignment Maps***
(to be inserted by user)
- c. ***List of Pre Qualified Contractors***
(to be inserted by user)
- d. ***Load Ticket***
- e. ***Debris Monitor Reports***
- f. ***Truck Certification List***
- g. ***Pilot Program Debris Plan Checklist***

Appendix D - Load Ticket

Load Ticket		Ticket No. 0012345	
Municipality (Applicant)		Prime Contractor	
		Sub-Contractor	
Truck Information			
Truck No		Capacity	
Truck Driver (print legibly)			
Loading Information			
Loading	Time	Date	Inspector/Monitor
Location (Address or Cross Streets)			
When Using GPS Coordinates use Decimal Degrees (N xx.xxxxx)			
N		W	
Unloading Information			
Debris Classification		Estimated %, CYs, or Actual Weight	
<input type="checkbox"/> Vegetation <input type="checkbox"/> C&D <input type="checkbox"/> White Goods <input type="checkbox"/> HHW <input type="checkbox"/> Other* See Below			
Unloading	Time	Date	Inspector/Monitor
DMS Name and Location			
*Other Debris Explanation		Original: Applicant Copy 1: _____ Copy 2: _____ Copy 3: _____	

Appendix E - Debris Monitor Reports

MONITOR DAILY ACTIVITY REPORT

Name: _____

Activity _____

Date_____

FEMA - 0000 - DR - 00

Location Covered by this report _____

Weather Conditions _____

Summary of Daily Activities

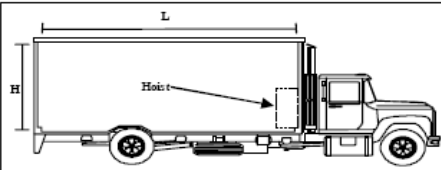
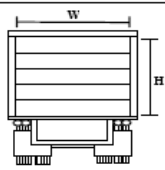
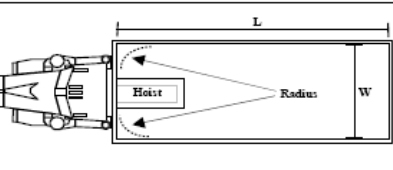
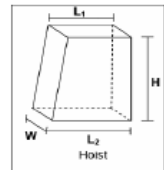
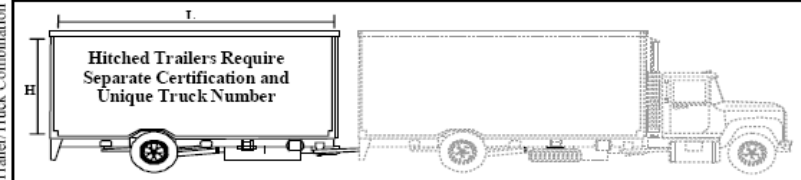
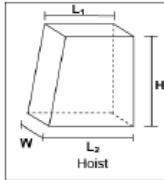
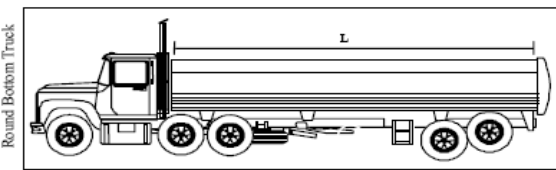
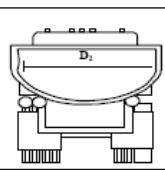
Safety Comments:

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Appendix F - Truck Certification List

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TRUCK CERTIFICATION FORM

DUMP TRUCK			
Measurements <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Truck Measurements Hoist Measurement Radius </div> <div style="width: 70%;"> Length (L) = <input style="width: 100px;" type="text"/> Length₁ (L₁) ft = <input style="width: 100px;" type="text"/> Length₂ (L₂) ft = <input style="width: 100px;" type="text"/> Radius ft = <input style="width: 100px;" type="text"/> Width (W) ft = <input style="width: 100px;" type="text"/> Width_H (W_H) ft = <input style="width: 100px;" type="text"/> Height (H) ft = <input style="width: 100px;" type="text"/> Height_H (H_H) ft = <input style="width: 100px;" type="text"/> Height (H) = <input style="width: 100px;" type="text"/> </div> </div>			
Calculations <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Bed Volume (Basic) Hoist Volume Radius Volume Total = </div> <div style="width: 40%;"> $(L \times W \times H) / 27 =$ <input style="width: 100px;" type="text"/> cyd $((L_1 + L_2) / 2 \times W_H \times H_H) / 27 =$ <input style="width: 100px;" type="text"/> cyd $(3.14 \times R^2 \times H) / 27 =$ <input style="width: 100px;" type="text"/> cyd <input style="width: 100px;" type="text"/> cyd </div> <div style="width: 30%; text-align: center;"> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p> </div> </div>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>			
EXTRA TRAILER			
Measurements <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Truck Measurements (Basic) Hoist Measurement Radius </div> <div style="width: 70%;"> Length (L) = <input style="width: 100px;" type="text"/> Length₁ (L₁) ft = <input style="width: 100px;" type="text"/> Length₂ (L₂) ft = <input style="width: 100px;" type="text"/> Radius ft = <input style="width: 100px;" type="text"/> Width (W) ft = <input style="width: 100px;" type="text"/> Width_H (W_H) ft = <input style="width: 100px;" type="text"/> Height (H) ft = <input style="width: 100px;" type="text"/> Height_H (H_H) ft = <input style="width: 100px;" type="text"/> Height (H) = <input style="width: 100px;" type="text"/> </div> </div>			
Calculations <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Bed Volume (Basic) Hoist Volume Radius Volume Total = </div> <div style="width: 40%;"> $(L \times W \times H) / 27 =$ <input style="width: 100px;" type="text"/> cyd $((L_1 + L_2) / 2 \times W_H \times H_H) / 27 =$ <input style="width: 100px;" type="text"/> cyd $(3.14 \times R^2 \times H) / 27 =$ <input style="width: 100px;" type="text"/> cyd <input style="width: 100px;" type="text"/> cyd </div> <div style="width: 30%; text-align: center;"> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p> </div> </div>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>			
ROUND BOTTOM TRUCK			
Measurements <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Truck Measurements </div> <div style="width: 70%;"> Length (L) ft = <input style="width: 100px;" type="text"/> Diameter (D) ft = <input style="width: 100px;" type="text"/> </div> </div>			
Calculations Approx. Volume $(3.14 \times (D/2)^2 \times L) / 27 =$ <input style="width: 100px;" type="text"/> cyd (round bottom portion only)			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="text-align: center; margin-top: 20px;"> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p> </div>			

G. Pilot Program Debris Plan Checklist

**Appendix E –
Increased Federal Share Incentive Checklist**

Applicant _____ PA ID _____ DR- _____

Point of Contact _____ Phone Number _____

Yes No

Debris Management Plan

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan outline the roles and responsibilities of the various functions identified (Public Works, Finance, and Solid Waste Departments, etc.)? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address health and safety procedures in accordance with State/Local health and safety standards/requirements? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan identify procedures for acquiring required regulatory permits? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address the basis for planning which include assumptions for various events and forecasting/modeling for debris volumes? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan include priorities for the clearance, collection, and disposal of debris? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address recycling? |
| <input type="checkbox"/> | <input type="checkbox"/> | Is there a process for the collection and disposal of hazardous waste and/or white goods? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address debris monitoring of the pickup sites, Debris Management Sites (DMS) or Temporary Debris Storage and Reduction Sites (TDSR) and final disposal? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan identify DMS' or TDSRs' and potential landfills for final disposal to include operation and site management procedures and staffing? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address the environmental requirements? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address contracting/procurement procedures? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does the plan address the authority and processes for private property debris removal? |

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Yes No

☐ ☐ Does the plan address the dissemination of information to the general public and media?

List of Pre-qualified contractors

☐ ☐ Does the applicant have a list of pre-qualified contractors?

☐ ☐ Does the applicant have documentation demonstrating how the list was obtained?

Approved _____

Disapproved _____

Signature _____

Date _____

Example

State Debris Management Plan

Inclusion of this example in the course does not necessarily indicate endorsement of the plan by the Federal Emergency Management Agency. Each State has specific requirements and limitations that will affect the contents of a Debris Management Plan.

This plan can be modified by jurisdictions or States to fit their organizational structure and debris management needs.

APPENDIX ____

DEBRIS REMOVAL

1.0 PURPOSE

1.1 To provide policies and guidance to the agencies of _____ for the removal and disposition of debris caused by an event and/or a major disaster.

1.2 To facilitate and coordinate the management of debris following a disaster in order to mitigate against any potential threat to the health, safety, and welfare of the impacted citizens, expedite recovery efforts in the impacted area, and address any threat of significant damage to improved public or private property.

2.0 SITUATION AND ASSUMPTIONS

2.1 SITUATIONS

2.1.1 Natural and man-made disasters precipitate a variety of debris that would include, but not limited to such things as trees, sand, gravel, building/construction material, vehicles, personal property, etc.

2.1.2 The quantity and type of debris generated from any particular disaster will be a function of the location and kind of event experienced, as well as its magnitude, duration, and intensity.

2.1.3 The quantity and type of debris generated, its location, and the size of the area over which it is dispersed, will have a direct impact on the type of collection and disposal methods utilized to address the debris problem, associated costs incurred, and how quickly the problem can be addressed.

2.1.4 In a major or catastrophic disaster, many state agencies and local governments will have difficulty in locating staff, equipment, and funds to devote to debris removal, in the short as well as long term.

2.2 ASSUMPTIONS

2.2.1 A natural or man-made disaster that requires the removal of debris from public or private lands and waters could occur in _____ at any time.

2.2.2 The amount of debris resulting from an event or disaster could exceed the local or county's ability to dispose of it.

2.2.3 If the event or disaster requires, the Governor would declare a state of emergency that authorizes the use of State resources to assist in the removal and disposal of debris. In the event Federal resources are required, the Governor would request Federal assistance in accordance with standard procedures established in the Federal Response Plan (FRP).

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2.2.4 Private contractors will play a significant role in the debris removal, collection, reduction, and disposal process of state agencies and local governments.

2.2.5 The debris management program implemented by state agencies and local governments will be based on the waste management approach of reduction, reuse, reclamation, resource recovery, incineration, and landfilling, respectively.

3.0 CONCEPT OF OPERATIONS

3.1 INITIAL ACTIONS

3.1.1 EOC Activation and Annex Implementation. When an event occurs that has generated debris that has exceeded local and county removal and disposal resources, then the _____ Emergency Management Agency will activate the Emergency Operations Center (EOC) according to standard operating procedures. This annex will be implemented and the Debris Management Task Force (DMTF) will be assembled to assist in the coordination and management of the debris removal and disposal process. The EOC Director or his designated representative in conjunction with the DMTF will determine the Emergency Support Functions (ESFs) that are required to support these removal and disposal efforts. Appendix 2 is a listing of core agencies and points of contact for the DMTF.

3.1.2 Estimating the Type and Amount of Debris. The amount of debris that is generated by an event can be estimated by several methods. One method is to accomplish a drive-through “windshield” damage assessment and estimate the amount of debris visually with the drive through. Another method that can be used is an aerial assessment by flying over the area using _____ State Police (__SP) and/or _____ National Guard (__NG) helicopters and Civil Air Patrol (CAP) reconnaissance flights. The damaged area can be assessed either visually or using aerial photography. Once the area has been assessed, the amount of debris may be estimated using a modeling methodology that was developed by the US Army Corps of Engineers (USACE) Emergency Management staff using actual data from Hurricanes Frederick, Hugo, and Andrew. This modeling technique is described in Appendix 3. An estimate of the amount of debris for all the incorporated towns in _____ has been calculated using this model and the results are shown in Appendix 4. The assumptions used in these calculations are included as part of this Appendix.

3.1.2 Site Selection Priorities. After the amount of debris has been estimated, the next critical issue that the DMTF will need to determine is the number of temporary sites and location of these sites for the collection and processing of debris. The priority of site location, as determined by the DMTF is:

3.1.3

First Priority: If possible, establish the site within the damaged area.

Second Priority: Pre-determined local, county, or state property.

Last Priority: Private property.

3.1.3 Pre-Designated Sites. The DMTF has pre-identified areas that may be used as temporary collection and processing sites. These general areas are identified on county maps located in Appendix 5. Detailed information pertaining to each of these sites is maintained by the Department of Natural Resources & Environmental Control (DNREC) Solid Waste Management Branch. The information includes exact location, size, available ingress and egress routes, results of an environmental assessment, initial data samples, etc. Baseline data should include videotapes, photographs, documentation of physical features, and soil and water samplings. This list of sites will be reviewed annually and updated as necessary as part of the normal plan maintenance.

There are only _____ State owned sanitary landfills operated by the _____ Solid Waste Authority (____SWA). One site is located in each county to include:

_____ County:

_____ County:

_____ County:

3.1.4 Existing Landfills. There are additional solid waste and resource recovery facilities within _____ but they are private facilities and generally allow only specific products. These facilities will be listed as available resources and will be considered as an option by the DMTF when an event occurs. A list of existing _____ landfills, resource recovery facilities and transfer stations is included as Appendix 6.

3.1.5 Site Preparation. After a pre-designated site has been selected to be activated, there are many preparatory actions that need to be accomplished. A Memorandum of Understanding (MOU) or a Memorandum of Agreement (MOA) would be required. An example MOU and MOA are included in Appendix 7. The initial base line data would be updated, the MOU/MOA would be signed and DNREC would issue an emergency variance to operate. The site operation layout would be determined by the DMTF to include ingress and egress routes.

3.2 DEBRIS REMOVAL

3.2.1 General

3.2.1.1 Hurricanes and other natural disasters can generate unprecedented amounts of debris in a few hours or a few minutes. The debris may be equally heavy in both urban and rural areas depending on the magnitude of the tree blow-down and associated structural damage such as homes, businesses, utilities, signs, etc. This section provides guidelines on debris removal issues including emergency roadway clearance, public right-of-ways removal, mobile home park removal, private property removal, navigation hazard removal and household hazardous waste (HHW) removal.

3.2.1.2 Debris removal, regardless of source, becomes a high priority following a disaster as it is a visible sign of action and helps to restore a sense of normalcy to a shocked and stunned

population. Removal often represents the first visible step towards recovery. In developing a management strategy for a large-scale debris removal operation, the operation should be divided into two phases. Phase I consists of the clearance of the debris that hinders immediate life saving actions being taken within the disaster area and the clearance of that debris which poses an immediate threat to public health and safety. Phase II operations consist of the removal and disposal of that debris which is determined necessary to ensure the orderly recovery of the community and to eliminate less immediate threats to health and safety.

3.2.2 Emergency Roadway Debris Removal (Phase I).

3.2.2.1 There is an immediate need to open emergency access routes into devastated areas following any type of major natural disaster. ___DOT and local governments must identify routes within their jurisdiction that are essential to emergency operations. This information is essential for directing the efforts of local assets and for identifying areas that State and Federal assistance can target.

3.2.2.2 Debris will include tree blow-down and broken limbs; yard trash such as outdoor furniture, trash cans, etc.; utility poles, power, telephone and cable TV lines, transformers and other electrical devices; building debris such as reefs, sheds and signs; and personal property such as clothing, appliances, boats, cars, trucks and trailers.

3.2.2.3 Roadway debris removal involves the opening up of arterial roads and collector streets by moving debris to the shoulders of the road. There is no attempt to physically remove or dispose of the debris, only to clear key access routes to expedite:

- Movement of emergency vehicles.
- Law enforcement.
- Resumption of critical services.
- Assessment of damage to key public facilities and utilities such as schools, hospitals, government buildings, municipal owned utilities.

3.2.2.4 The requirement for government services will be increased drastically following a major natural disaster. Therefore, after emergency access has been provided to hospitals, police, and fire stations, the next priority is to open access to other critical community facilities such as municipal buildings, water treatment plants, wastewater treatment plants, power generation units and airports.

3.2.2.5 Damaged utility systems, structurally unstable buildings and other heavily damaged public facilities must be expeditiously repaired, deactivated, barricaded, or removed. Activities involving these facilities should be closely coordinated with their owners and/or operators. Demolition of unsafe structures, which constitute a public health and safety threat in most situations, may be deferred if access to the area can be controlled.

3.2.2.6 Emergency management and/or the DMTF should be aware of local, State and Federal capabilities to provide service for emergency roadway debris removal. Available resources should include:

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Local and State Governments:

- Municipal workers and equipment.
- Local and State DOT workers and equipment.
- National Guard.
- Local contractors hired by local and/or State governments

Federal Assistance:

- US Department of Agriculture (USDA) Forest Service chain saw crews.
- Local US Army Corps of Engineers (USACE) workers and equipment.
- Department of Defense (DOD).
- Regional contractors hired by the Federal Emergency Management Agency (FEMA) or the USACE.

3.2.2.7 Immediate debris removal actions should be supervised by local public works or DOT personnel using all available resources. Requests for additional assistance and resources should be made to the State EOC. Requests for Federal assistance will be requested through the State Coordinating Officer (SCO) to the FEMA Federal Coordinating Officer (FCO). The request will be directed to the Federal assistance debris coordinator (if on site and operational), or the USACE district authorized to contract services for FEMA.

3.2.2.8. Special crews equipped with chain saws may be required to cut up downed trees. This activity is hazardous and common sense safety considerations are necessary to reduce the chance of injury and possible loss of life. When live electric lines are involved, work crews should coordinate with local utility companies to have power lines deenergized for safety reason.

3.2.2.9 Front end loaders and dozers should be equipped with protective cabs. Driveway cutouts, fire hydrants, valves, and stormwater inlets should be left unobstructed. All personnel should wear protective gear such as hard hats, gloves, goggles, and safety shoes.

3.2.2.10 The USDA Forest Service and other State and Federal land management agencies are equipped for fast responses to forest fires. In recent years, they have been called upon to respond to other emergencies such as earthquakes, tornadoes, and hurricanes. The Forest Service is assigned to Emergency Support Function (ESF) #7 under the FRP for fire fighting support to State agencies. Assistance would be requested through the State EOC/SCO to the FCO according to standard procedures.

3.2.2.11 Assessment of the amounts and types of debris to be removed from key routes is very difficult. This drawback slows the development of the right mix of equipment and manpower, especially when contracting for additional resources. Therefore, the equipment rental contract is recommended for this type of debris removal. It will allow the flexibility to respond to local hot spots.

3.2.3 Public Right-of-Way Debris Removal (Phase II).

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3.2.3.1 Debris is simply pushed to the shoulders of the roadway during the emergency opening (Phase I) of key routes. There is little time or concern for sorting debris at that time. The objective is to provide for the safe movement of emergency and support vehicles into and out of the disaster area.

3.2.3.2 As removal operations progress, the initial road side piles of debris become the dumping location for additional yard waste and other storm generated debris such as construction material, personal property, trash, white goods (refrigerators, washers, dryers, hot water heaters, etc.), roofing, and even household, commercial, and agricultural chemicals.

3.2.3.3 Expedient removal of debris from in front of residents' homes should become a priority since it is a positive sign that restoration actions are underway and may help counteract depression and helplessness of the affected residents. The removal operations will also assist in expediting the replacement of key utilities located along public rights-of-way.

3.2.3.4 The emergency manager and/or DMTF will be faced with the monumental task of coordinating debris removal that represents a significant health and safety hazard to the community. There will be requests from all sectors of the community to remove the debris so that residents can start putting their lives and property in order.

3.2.3.5 Local and State government force account employees will transition from opening roadways to clearing rights-of-way. State DOT forces from other districts and other community work forces (mutual aid agreements) may become available as will locally hired contractors who normally have limited resources. For large scale/catastrophic disasters, direct Federal assistance, if required, will be provided by FEMA, USACE, DOD and large regional contractors with resources, experience, short mobilization times, and an understanding of Federal contracting procedures.

3.2.3.6 The emergency management and/or the DMTF will be required to provide accurate information surrounding the magnitude of the debris removal mission. Providing information to FEMA Region ____ headquarters and coordinating with other agencies may require an independent means to assess debris removal progress. This void can be filled using local or State personnel to create independent field inspection teams. The teams become the “eyes and ears” for the debris staff.

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3.2.3.7 The emergency management and/or the DMTF should be prepared to take the following actions:

- Coordinate through local agencies to establish a contracted work force capable of expeditious removal of the debris.
- Develop an independent team using the local and State personnel to monitor the removal activities. This team becomes the debris manager’s “eyes and ears” in the field.
- Conduct daily update briefings with key debris managers. Ensure that all major debris removal and disposal actions are reviewed and approved by the local debris manager.
- Ensure that a representative of the DMTF attends all briefings to resolve any coordination problems between State and Federal debris removal efforts and local debris removal and disposal efforts
- Coordinate with local and State DOT and law enforcement authorities to ensure that traffic control measures expedite debris removal activities.
- Establish a pro-active information management plan involving the Governor’s Press Secretary, ___EMA PIO, and other agency PIOs. Emphasis should be placed on actions that the public can perform to expedite the cleanup process, such as *separating burnable and nonburnable debris; segregating HHW; placing debris at the curbside; keeping debris piles away from fire hydrants, valves, etc; reporting locations of illegal dump sites or incidents of illegal dumping; and segregating recyclable materials.*
- The public should be kept informed of debris pick-up schedules, disposal methods and ongoing actions to comply with State and Federal Environmental Protection Agency (EPA) environmental regulations, disposal procedures for self-help and independent contractors, and restrictions and penalties for creating illegal dumps.
- Agency PIOs should be prepared to respond to questions pertaining to debris removal from the press and local residents. If required, a Joint Information Center (JIC) may be established to ensure a coordinated response is made to the public. The following questions are likely to be asked:
 - What is the pick-up system?*
 - When will the contractor be in my area?*
 - Who are the contractors and how can I contact them?*
 - Should I separate the different debris materials and how?*
 - How do I handle Household Hazardous Waste (HHW)?*
 - What if I cannot pay?*
 - What if I am elderly?*

3.2.4 Mobile Home Park Debris Removal

3.2.4.1 Hurricanes and tornadoes can cause almost complete destruction to mobile homes. This results in extensive amounts of mixed debris confined to relatively small areas. The mixed debris will include:

- tree blow-down, out buildings, screened porches, trailer frames, personal property such as clothing, food, furniture, etc.;
- appliances such as stoves, refrigerators, washers, dryers, etc.;
- household chemicals, commercial chemicals, propane and oxygen tanks, gasoline, oil, lubricants, automobiles, trucks, bicycles, lawn mowers, and utility hookups.

3.2.4.2 A catastrophic disaster may require temporary housing that cannot be provided by local or State agencies. If Direct Federal Assistance is requested and approved, FEMA may provide mobile homes on a temporary basis under the Individual Assistance (IA) Program. FEMA's IA managers must obtain suitable locations to place FEMA mobile homes to provide temporary shelter expeditiously. Local mobile home parks will be surveyed and arrangements made with park owners for FEMA to clear the parks of debris in return for the park to lease pads for FEMA mobile homes. The local emergency manager and/or the DMTF will need to closely coordinate with his/her counterpart in the FEMA IA office to assist in possible clean-up activities and to enforce condemnation procedures. The debris removal mission must strive to retain the existing undamaged utility hookups. Legal aspects as well as health and safety concerns will have an important impact on the debris removal activities.

3.2.4.3 Documentation Needed Prior to Contract Issuance:

Local officials should:

- Obtain copies of the local ordinance authorizing condemnation of mobile home parks. Condemnation due to health issues is associated with prolonged exposure of trailer contents to the natural elements.
- Provide a copy of the local government resolution with appropriate recitals required to support adoption/enactment of ordinances to condemn, demolish and remove mobile home park contents.
- Provide all applicable permits necessary for demolition of the mobile home park.
- Provide access to all lands, easements and rights-of-way necessary for the accomplishment of the approved work.
- Acquire documentation signed by the mobile home park owner that will hold and save the local, State or Federal Government free from damages due to the requested work, and shall indemnify the local, State or Federal Government against any claims arising from such work.
- Provide documents allowing right-of-entry to the mobile home parks.

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- Provide notice to individual mobile home owners to remove items of personal property in accordance with local ordinances.
- Provide the names of mobile home parks to include the names of mobile home park owners, complete addresses and legal descriptions of the property, and limits, if any, of debris clearance to occur within the parks. Additional materials should include plats of the mobile home parks and any information about existing utilities. If the system is available, the EIS should be utilized to identify these mobile home parks.
- Ensure that the mobile homes are unoccupied.
- Ensure that the property is posted in accordance with local regulations and that mobile home owners have removed their personal property.
- Ensure that any agreement made with the mobile home park owner is in writing to avoid subsequent disputes.
- Obtain photographic documentation of trailer sites prior to commencement of work.

3.2.4.4. Utilities:

Local officials should:

- Ensure that utilities are installed according to local code.
- Ensure that trailer tie down straps do not conflict with utility placement.
- Be responsible for turning off utility services such as water, sewer, electrical, natural gas.
- Have septic tank locations flagged prior to debris removal and special care given to protect them during debris removal operations.
- Evaluate existing utilities as to the feasibility of using them. Consideration should also be given to whether using heavy equipment would cause further damage to existing utilities.
- Provide standards for capping of all utilities.

3.2.4.5 Contracts:

The contract should:

- Provide that all private automobiles be stored in a specific location within the park to be retrieved later by the private owner.

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- Provide salvage rights to the contractor for materials remaining on site at the time of debris removal.
- Require flagging of existing utilities prior to debris removal. Rubber tire vehicles and backhoe with grapple attachments should be used to protect existing utilities.
- Require the contractor to phase debris removal operations to allow utility repair/replacement to begin immediately after an area has been cleared.
- Provide a signed letter to the contractor/FEMA identifying the park and stating that all notices have been issued and the park is released for debris removal.

3.2.4.6 Inspection Prior to Contract Issuance:

Local officials should:

- Should determine the extent of repairs required to use existing utilities or if full replacement of utilities will be required. These actions require close coordination with IA officials responsible for the temporary housing operations.
- Ensure that the mobile home park will be vacated prior to removing any debris from the site.
- Describe clearly and completely the extent of debris removal required within the mobile home park. Specify any structures, other than mobile homes, that are to be removed. This information will be utilized in developing the contract scope of work.
- Locate and estimate any HHW within the park and ensure that appropriate procedures are established for separation and removal of such materials prior to debris removal. HHW contractors under contract with the local government should be utilized for this task via FEMA's Damage Survey Report (DSR) process or the USACE could award a separate contract for this purpose. HHW items typically found on site include propane tanks, paint cans, paint thinners, pesticides, refrigerators, freezers, etc.
- Conduct initial inspections of the mobile home park. This should be done in conjunction with representatives from public health office, building and zoning office, real estate office, USACE, and FEMA.
- Notify the mobile home park owner of the pending inspections.
- Ensure that the "Notice to Proceed" contract scope of work reflects findings of the field inspection.

3.2.5 Private Property Debris Removal

3.2.5.1 Major natural disasters may create health and safety concerns with respect to severely damaged private property. Remaining dangerous structures should be the responsibility of the owner or local government to demolish to protect the health and safety of adjacent residents. However, experience has shown that unsafe structures will remain due to lack of insurance, absentee landlords, or under-staffed and under-equipped local governments. Consequently, demolition of these structures may become the responsibility of the local emergency manager and/or the DMTF.

3.2.5.2 This issue will require the complete cooperation of numerous local and State government officials and may require resources from any or all of the following: real estate offices, local law and/or code enforcement agencies, State historic preservation office, qualified contractors to remove HHW, asbestos, and lead-based paint, and field teams to photograph the sites before and after demolition.

3.2.5.3 Demolition of private property will present significant coordination problems. Therefore, a checklist has been developed to identify key tasks that local officials must address before the structure is approved for demolition. To expedite the overall effort, many of the tasks can be conducted concurrently. The “Demolition of Private Property” checklist is shown in Appendix 8.

3.2.5.4 Communities in disaster-prone areas should have copies of the checklist and samples of required ordinances as part of the community’s emergency management plan. The ordinances should be activated when a “state of emergency” is implemented, eliminating any unnecessary waiting period. All of these pre-planning actions should be accomplished prior to a disaster.

3.2.5.5 The most significant building demolition problem will be that local governments do not have proper ordinances in effect to handle emergency condemnation procedures. Moreover, structures will be misidentified or have people or belongings in them when the demolition crews arrive. Buildings may be occupied by drug users or homeless people who will necessitate removal by local law enforcement. Close coordination is essential and it is recommended that at least one FEMA staff person be on site to work directly with the local government staff to ensure that all required legal actions are taken.

3.2.6 Navigation Hazard Removal

3.2.6.1 Publicly owned marinas damaged by a major natural disaster are eligible for Federal assistance. In addition to the marina facilities, damage may include abandoned sunken boats and other debris that may threaten navigation.

3.2.6.2 The emergency manager and/or the DMTF will need to coordinate with the USACE, the U.S. Coast Guard, State Marine Patrol, local government agencies, legal counsel, contractors specialized in marine salvage operations, commercial divers, and certified surveyors to ensure that navigation hazards are removed safely and efficiently.

3.2.6.3 A checklist has been developed to ensure that all aspects of removing navigational hazards are considered. The “Removal of Navigational Hazards” Checklist is shown on Appendix 9.

3.2.7 Household Hazardous Wastes (HHW) Removal.

3.2.7.1 HHW may be generated as a result of a major natural disaster. HHW may consist of common household chemicals, propane tanks, oxygen bottles, batteries, and industrial and agricultural chemicals. These items will be mixed into the debris stream and will require close attention throughout the debris removal and disposal process.

3.2.7.2 Pre-Disaster. The emergency manager and/or DMTF should be aware of the problems that HHW will have on the overall debris removal and disposal mission. Consider HHW response teams to be assigned and respond ahead of any removal efforts. Consider preparing draft emergency contracts with generic scopes of work. Coordinate with regulatory agencies concerning possible regulatory waivers and other emergency response requirements.

3.2.7.3 Removal Operations. Where possible, separate hazardous materials from other debris before removal. Arrange for salvageable hazardous materials to be collected and segregated based on their intended use. Removal of hazardous waste should be accomplished by properly trained personnel or emergency response HHW contractors. Coordinate with regulatory agencies to ensure cleanup actions meet local, State, and Federal regulations.

3.2.7.4 Building Demolition. Complete HHW identification and segregation before building demolition begins. HHW debris should be removed by qualified contractors. Uncontaminated debris can be removed by regular demolition contractors.

3.2.7.5 Disposal Sites. A separate staging area for HHW materials, contaminated soils, and contaminated debris should be established at each site. The staging area should be lined with an impermeable material and bermed to prevent contamination of the groundwater and surrounding area. Materials should be removed and disposed of using qualified HHW personnel/contractors in accordance with local, State and Federal regulations.

3.3 DEBRIS COLLECTION AND REDUCTION SITES

3.3.1 Once the debris is removed from the damaged area, it will be taken to temporary collection and reduction sites. These reduction sites have been pre-identified as discussed in Sec 3.1.3 and shown on county maps located in Appendix 5. Removal and disposal actions will be handled at the lowest level possible based on the magnitude of the event. It follows the normal chain of responsibility, i.e. local level, county level, state level and when resources are exceeded at each level of responsibility, and then Federal assistance may be requested according to established procedures. Due to the limited debris removal and reduction resources, the establishment and operation of these temporary sites are generally accomplished by contracts.

3.3.2 Emphasis is placed on local government responsibilities for developing debris disposal contracts under FEMA Damage Survey Report (DSR) procedures. Removal and reduction activities may be handled locally or assigned to the USACE by FEMA pursuant to CFR 44, Section 206.5 and 206.8. Mission assignment may be used instead of DSRs when responding to a catastrophic natural disaster. This allows FEMA and the USACE more flexibility in responding to specific debris removal and disposal tasks.

3.4.3 Local/county and/or State governments may be responsible for developing and implementing these contracts for debris removal and disposal under most disaster conditions that are not catastrophic. The costs associated with preparing, implementing, and monitoring contracts are covered under FEMA DSR procedures. The local emergency manager and/or the DMTF (based on magnitude of event) should review all debris disposal contracts. There should be a formal means to monitor contractor performance in order to ensure that funds are being used wisely.

3.4.4 Site Preparation. The topography and soil conditions should be evaluated to determine best site layout. Consider ways to make remediation and restoration easier when planning site preparation.

3.4.4 Site Operations. Site preparation and operation are usually left up to the contractor but guidance can help avoid problems with the ultimate closeout.

3.4.4.1 Establish lined temporary storage areas for ash, HHW, fuels, and other materials that can contaminate soils and groundwater. Set up plastic liners when possible under stationary equipment such as generators and mobile lighting plants. Include this as a requirement of the contract scope of work.

3.4.4.2 If the site is also an equipment staging area, monitor fueling and equipment repair to prevent and mitigate spills of petroleum products, hydraulic fluids, etc. Include clauses in contract scope of work to require immediate cleanup by the contractor.

3.4.4.3 Not In My Back Yard (NIMBY) Concerns. Be aware of and mitigate things that will irritate the neighbors such as:

smoke - proper construction and operation of burn pits. Don't overload air curtains.

dust - employ water trucks.

noise - construct perimeter berms.

traffic - proper layout of ingress and egress procedures to help traffic flow.

3.5 DEBRIS REDUCTION METHODS

This section provides guidelines on debris volume reduction methods including burning, grinding and chipping, and recycling. The DMTF should have an understanding of each method. Ideally, all methods should comply with local ordinances and environmental regulations.

3.5.1 Volume Reduction by Burning

3.5.1.1 There are several burning methods available including *uncontrolled open burning*, *controlled open burning*, *air curtain pit burning*, and *refractor lined pit burning*. The DMTF should consider each burning method before selection and implementation as part of the overall volume reduction strategy.

- **Uncontrolled Open Burning:** Uncontrolled open burning is the least desirable method of volume reduction because it lacks environmental control. However, in the haste to make progress, DNREC may issue waivers to allow this method of reduction early in a disaster.

- **Controlled Open Burning:** Controlled open burning is a cost-effective method for reducing clean woody tree debris in rural areas. This option must be terminated if mixed debris (treated lumber, poles, nails, bolts, tin, aluminum sheeting, etc.) enters the waste flow. Clean woody tree debris presents little environmental damage and the resulting ash can be used as a soil additive by the local agricultural community. _____ Department of Agriculture and _____ County agricultural extension personnel should be consulted to determine if and how the resulting ash can be recycled as a soil additive. Responsible agencies and telephone numbers are listed below.

_____ Department of Agriculture
_____ County Extension Office
_____ County Extension Office
_____ County Extension Office

- **Air Curtain Pit Burning:** Air curtain pit burning offers an effective means to expedite the volume reduction process by substantially reducing the environmental concerns caused by open burning. Specifications and statements of work should be developed to expedite the proper use of the systems since experience has shown that many contractors and subcontractors are not fully knowledgeable of the system operating parameters.

- **Refractor Lined Pit Burning:** Pre-manufactured refractory lined pit burners are an alternative to air curtain open pit burning. The units can be erected on site in a minimal amount of time. Some are portable and others must be built in-place. The units are especially suited for locations with high water tables, sandy soil, or where materials are not available to build above ground pits. The engineered features designed into the units allows for a reduction rate of approximately 95 percent with a minimum of air pollution. The units use air curtain blowers that deliver air at predetermined velocities and capacities. A nozzle 20 feet long would have a velocity of over 120 miles per hour and would be delivering over 20,000 cubic feet of air per minute to the fire. The air traps smoke and small particles and recirculates them to enhance combustion that reaches over 2500 degrees Fahrenheit. Manufacturers claim that combustion rates of about 25 tons per hour are achievable while still meeting emission standards.

3.5.1.2 Coastal areas may present contractors with unique problems when they start using the air curtain burner systems. Existing soil conditions and a high water table may prevent the digging of pits to meet manufacturers' specifications. Initially pits may be constructed by pushing up the existing topsoil. This procedure is unsatisfactory because the pit sides will erode. Controls should be implemented to prevent contamination of the ground water. An acceptable but very expensive solution is to use compacted limestone fill placed over an impervious clay layer.

3.5.1.3 Local officials, environmental groups, and local citizens should be thoroughly briefed on the type of burning method being used, how the systems work, environmental standards, health issues, and the risk associated with each type of burning. PIOs should take the initiative to keep the public informed. A proactive public information strategy to include press releases, media broadcasts, etc. should be included in any operation that envisions burning as a primary means of volume reduction.

3.5.1.4 Environmental controls are essential for all burning methods and should include:

- A setback of at least 1000 feet should be maintained between the debris piles and the burn area. Keep at least 1000 feet between the burn area and the nearest building. Contractors should use fencing and warning signs to keep the public away from the burn area.
- The fire should be extinguished approximately two hours before anticipated removal of the ash mound. The ash mound should be removed when it reaches two feet below the lip of the burn pit.
- The burn area should be placed in an above ground or below ground pit that is no wider than eight feet and between nine and 14 feet deep.
- The burn pits should be constructed with limestone and reinforced with earth anchors, or wire mesh in order to support the weight of the loaders. There should be a one-foot impervious layer of clay or limestone on the bottom of the pit to seal the ash from the aquifer.

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- The ends of the pits should be sealed with dirt or ash to a height of four feet.
- A twelve-inch dirt seal should be placed on the lip of the burn pit area to seal the blower nozzle. The nozzle should be three to six inches from the end of the pit.
- There should be a one-foot high, unburnable, warning stops along the edge of the pit's length to prevent the loader from damaging the lip of the burn pit.
- Hazardous or contaminated ignitable material should not be placed in the pit. This is to prevent contained explosions.
- The airflow should hit the wall of the pit about two feet below the top edge of the pit and the debris should not break the path of the airflow except during dumping.
- The pit should be no longer than the length of the blower system and the pit should be loaded uniformly along the length.

3.5.1.5 Dead Animal Incinerators. It is very probable that an event may require the removal of dead animals as part of the debris management process. _____ has _____ fixed incinerators that handle dead animal remains. The list is provided below. Air Quality Management Section maintains a more detailed listing of the facilities, addresses, capability and any restrictions, if applicable. Mobile incinerators may be used to manage dead animals; however, _____ air regulations require permits for such operations, which must have prior zoning approval. Permit applications are required by statute to be advertised which creates the possibility that public hearings may be requested, thus delaying the permitting process. _____ air regulations specifically prohibit the transfer of a permit from one location to another. If, as a result of a state disaster or emergency declared by the Governor, these permitting restrictions were waived, the use of properly designed and operated mobile incinerators would be preferable to the use of “air-curtain incinerators.”

<u>Facility</u>	<u>Location</u>	<u>Capacity</u>
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3.5.2 Volume Reduction by Grinding and Chipping.

3.5.2.1 Hurricanes and tornadoes may present the opportunity to employ large scale grinding and chipping operations as part of the overall debris volume reduction strategy. Hurricanes can blow away scarce topsoil in the agricultural areas and cause extensive tree damage and blow-down. This two-fold loss, combined with local climatic conditions may present an excellent opportunity to reduce clean woody debris into suitable mulch that can be used to replenish the topsoil and retain soil moisture.

3.5.2.2 Grinding and chipping woody debris is a viable reduction method. Although more expensive than burning, grinding and chipping is more environmentally friendly and the resulting product, mulch, can be recycled. In some locations the mulch will be a desirable product due to shallow topsoil conditions. In other locations it may become a landfill product.

3.5.2.3 Grinding and chipping woody debris reduces the large amounts of tree blow-down. Chipping operations are suitable in urban areas where streets are narrow or in groves of trees where it is cheaper to reduce the woody vegetation to mulch than to move it to a central grinding site and then returning it to the affected area. This reduces the costs associated with double handling.

3.5.2.4 Emergency management and/or the DMTF should work closely with local environmental and agricultural groups to determine if there is a market for mulch. Another source for disposal of ground woody debris may be as an alternative fuel for industrial heating or for use in a cogeneration plant.

3.5.2.5 There are numerous makes and models of grinders and chippers on the market. When contracting, the most important item to specify is the size of the mulch. If the grinding operation is strictly for volume reduction, size is not important. However, mulch to be used for agricultural purposes must be of a certain size and be virtually free of paper, plastic, dirt, etc.

3.5.2.6 The following specifications should provide a mulch product that is suitable for agricultural purposes.

- The average size of wood chips produced should not exceed four inches in length and one half inch in diameter. Production output should average 100 to 150 cubic yards per hour when debris is moderately contaminated and slow feeding operations, and 200 to 250 cubic yards per hour for relatively clean debris. Note, this is not machine capability; this is contractor output or performance capabilities.
- Contaminants are all materials other than wood products and should be held to ten percent or less for the mulch to be acceptable. Plastics are a big problem and should be eliminated completely. To help eliminate contaminants, root rake loaders should be used to feed or crowd materials to the grapplers. Bucket-loaders tend to scoop up earth, which is a contaminant, and cause excessive wear on the grinder or chipper. Hand laborers should remove contaminants prior to feeding the grinders. Shaker screens should be used when processing stumps with root balls or when large amounts of soil are present in the woody debris.

3.5.2.7 Chippers are ideal for use in residential areas, orchards, or groves. The number of damaged and uprooted trees present significant problems if they are pushed to the right-of-ways for eventual pick-up and transport to staging and reduction sites. The costs associated with chipping are reasonable since the material does not need to be transported twice.

3.5.2.8 Grinders are ideal for use at debris staging and reduction sites due to their high volume reduction capacity. Locating the grinders is critical from a noise and safety point-of-view. Moreover, there is a need for a large area to hold the woody debris and an area to hold the resulting mulch. Ingress and egress to the site is also an important consideration.

3.5.3 Volume Reduction by Recycling.

3.5.3.1 Recycling reduces mixed debris volume before it is hauled to a landfill. Recycling is attractive and strongly supported by _____ since there may be an economic value to the recovered material if it can be sorted and sold. A portable Materials Recovery Facility (MRF) could be set up at the site. Metals, weed and soils are prime candidates for recycling. The major drawback is the potential environmental impact of the recycling operation. In areas where there is a large usage of chemical agricultural fertilizer the recovered soil may be too contaminated for use on residential or existing agricultural land.

3.5.3.2 Hurricanes and earthquakes may present opportunities to contract out large-scale recycling operations and to achieve an economic return from some of the prime contractors who exercise their initiative to segregate and recycle debris as it arrives at the staging and reduction sites. Recycling has significant drawbacks if contracts are not properly written and closely monitored.

3.5.3.3 Specialized contractors should be available to bid on disposal of debris by recycling if it is well sorted. Contracts and monitoring procedures should be developed to ensure that the recyclers comply with local, State, and Federal environmental regulations.

3.5.3.4 Recycling should be considered early in the debris removal and disposal operation since it may present an opportunity to reduce the overall cost of the operation. The following materials are suitable for recycling.

- **Metals.** Hurricanes and tornadoes may cause extensive damage to mobile homes, sun porches, and green houses. Most of the metals are non-ferrous and suitable for recycling. Trailer frames and other ferrous metals are also suitable for recycling. Metals can be separated using an electromagnet. Metals that have been processed for recycling can be sold to metal recycling firms.
- **Soil.** Cleanup operations using large pieces of equipment pick up large amounts of soil. The soil is transported to the staging and reduction sites where it is combined with other organic materials that will decompose over time. Large amounts of soil can be recovered if the material is put through some type of screen or shaker system. This procedure can produce significant amounts of soil that can either be sold or recycled back into the agricultural community. This soil could also be used at DSWA landfills for cover. It is more expensive to transport and pay tipping fees at local landfills than to sort out the heavy dirt before moving the material. Monitoring and testing of the soil may be necessary to ensure that it is not contaminated with chemicals.
- **Wood.** Woody debris can be either ground or chipped into mulch. (See Section 3.3.2 Volume Reduction by Grinding and Chipping)
- **Construction Material.** Concrete block and other building materials can be ground and used for other purposes if there is a ready market. Construction materials and

wood can also be shred to reduce volume. This construction material could also be used at DSWA landfills for cover.

- **Residue Material.** Residue material that cannot be recycled, such as cloth, rugs, and trash can be sent to a landfill for final disposal.

3.6 SITE CLOSE-OUT PROCEDURES

3.6.1 Each temporary debris staging and reduction site will eventually be emptied of all material and be restored to its previous condition and use. If the size of event required mission tasking from the USACE, then the mission tasking may include requirements to cleanup contractor-operated staging and reduction sites. Contractors would be required to remove and dispose of all mixed debris, construction and demolition (C&D) debris, and debris residue to approved landfills. Quality Assurance (QA) inspectors should monitor all closeout and disposal activities to ensure that contractors complied with contract specifications. Additional measures will be necessary to meet local, State, and Federal environmental requirement due to the nature of the staging and reduction operation.

3.6.2 The emergency management and/or DMTF must be assured by the contractor that all sites are properly remediated. There will be significant costs associated with this operation as well as close scrutiny by the local press and environmental groups. Site remediation will go smoothly if baseline data collection and site operation procedures are followed.

3.6.3 The basic close-out steps are: remove all debris from the site; conduct an environmental audit/assessment, develop a remediation/restoration plan, approved by the appropriate environmental agency; execute the plan; get acceptance from the landowner; and terminate lease payments, if applicable. The key to timely closeout of the mission is the efficient scheduling of the above activities for multiple sites. Therefore, critical path scheduling of all the activities as far in advance as possible will minimize down time between steps.

3.6.4 Environmental Restoration. Stockpiled debris will be a mix of woody vegetation, construction material, household items, and yard waste. HHW and medical wastes should be segregated and removed prior to stockpiling. Activities at the debris disposal sites will include some, or a combination of the following activities: stockpiling, sorting, recycling, burning, grinding, and chipping. Burning is done in pits fed by an air curtain and generally only woody debris is burned; however, the efficiency of the burn and the quality of burn material is highly variable. Contamination may occur from petroleum spills at staging and reduction sites or runoff from the debris piles, burn sites, and ash piles.

3.6.5 Site Remediation. During the debris removal process and after the material has been removed from each of the debris sites, environmental monitoring will be needed to close each of the sites. This is to ensure that no long-term environmental contamination is left on the site. The monitoring should be done on three different media: ash, soil, and groundwater.

- The monitoring of the ash should consist of chemical testing to determine the suitability of the material for landfilling.

APPENDIX T – Debris Plans for Local Government

- Monitoring of the soils should be by portable methods to determine if any of the soils are contaminated by volatile hydrocarbons. This may be done by the contractors if it is determined that they dumped hazardous material, such as oil or diesel fuel spills on the site. This phase of the monitoring should be done after the stockpiles are removed from the site.
- The monitoring of the groundwater should be done on selected sites in order to determine the probable effects of rainfall leaching through either the ash areas or the stockpile areas.

3.6.6 A recommended format for a closure checklist has been developed. The closure checklist is shown on Appendix 10. Consider the following requirements to closeout a temporary staging and reduction site(s).

- Coordinate with local and State officials responsible for construction, real estate, contracting, project management, and counsel regarding requirements and support for implementation of a site remediation plan.
- Establish a testing and monitoring program. The contractor should be responsible for environmental restoration of both public and leased sites. Contractors will also be required to remove all debris from sites for final disposal at landfills prior to closure.
- Reference appropriate and applicable environmental regulations.
- Prioritize site closures.
- Schedule closeout activities.
- Determine separate protocols for air, water, and soil testing.
- Develop cost estimates.
- Develop decision criteria for certifying satisfactory closure based on limited baseline information.
- Develop administrative procedures and contractual arrangements for closure phase.
- Inform local and State environmental agencies regarding acceptability of program and established requirements.
- Designate approving authority to review and evaluate contractor closure activities and progress.
- Retain staff during closure phase to develop site-specific remediation for sites, as needed, based on information obtained from the closure checklist.

4.0 ORGANIZATION AND RESPONSIBILITIES

4.1 STATE DEPARTMENTS AND AGENCIES

4.1.1 The Office of the Governor will:

- Declare a State of Emergency if required.
- Issue supplementary declarations and orders, as the situation requires.
- Request Federal assistance as necessary.
- Make public safety/evacuation recommendations to the public.

4.1.2 Department of Public Safety will:

- Make public safety recommendations to the Governor.
- Evaluate protective actions as recommended by ___EMA/State EOC.

4.1.3 _____ Emergency Management Agency will:

- Perform as Primary Agency for ESF 5, Information and Planning.
- Perform as a core agency in the Debris Management Task Force.
- Activate the State Emergency Operations Center (EOC) when necessary using established Standard Operating Procedures (SOP). Partial activation may be necessary during early phases of an event. Full Emergency Support Function (ESF) activation will be required when a catastrophic event is imminent or has occurred in _____. ESF representatives responding to the EOC must have the knowledge of their department and their resources and have full authority to commit those resources for response and recovery operations.
- Implement the Damage Assessment Annex, if necessary, to assess and evaluate the damage and debris removal requirements.
- Send emergency management liaisons to local EOCs to assist response and recovery operations.
- Monitor the weather and make distribution of National Weather Service advisories to appropriate agencies if weather conditions are a factor to debris removal efforts.
- (More actions may be added)

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4.1.4 Department of Natural Resources & Environmental Control will:

- Perform as the Primary Agency for ESF 10, Hazardous Material.
- Perform as a core agency in the Debris Management Task Force.
- Develop a plan of action for an event for the removal and disposal of HHW debris.
- (to be developed)

4.1.5 _____ Department of Transportation will:

- Perform as Primary Agency for ESF 1, Transportation, and ESF 3, Public Works and Engineering.
- Perform as a core agency in the Debris Management Task Force.
- Identify routes, in conjunction with local jurisdictions that are essential and critical to emergency operations.
- Be responsible for coordinating the emergency roadway clearance and public right-of-way clearance plan of action.
- Ensure emergency workers wear protective clothing such as hard hats, gloves, goggles and safety shoes. Supervisors must emphasize safety practices and procedures.
- Coordinate with local utility companies during emergency roadway clearance operations.
- (to be developed)

4.1.6 _____ State Fire School will:

- Perform as the Primary Agency for ESF 4, Firefighting and ESF 9, Search and Rescue.
- (to be developed)

4.1.7 Department of Administrative Services will:

- Perform as the Primary Agency for ESF 7, Resource Support, and ESF 12, Energy.
- Perform as a core agency in the Debris Management Task Force.
- (to be developed)

4.1.8 _____ National Guard will:

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- Perform as the Primary Agency for ESF 14, Military Support.
- Perform as a core agency in the Debris Management Task Force.
- Coordinate with DELDOT to assist in the emergency roadway clearance and public right-of-way clearance operations.
- (to be developed)

4.1.9 _____ Solid Waste Authority will:

- Perform as a core agency in the Debris Management Task Force.
- (to be developed)

4.1.10 Public Utilities will:

- Coordinate with ____DOT to deenergize downed power lines during emergency roadway clearance and public right-of-way clearance operations.
- (to be developed)

4.1.11 etc.

4.2 COUNTY AND MUNICIPAL GOVERNMENT

4.2.1 County Emergency Management Agencies will:

- Perform as core agencies in the Debris Management Task Force if their county is involved.
- (to be developed)

4.2.2 Local/Municipal Emergency Management Agencies will:

- Perform as core agencies in the Debris Management Task Force if their municipality is involved.
- (to be developed)

4.3 SUPPORT AGENCIES

4.3.1 _____ Chapter of the American Red Cross will:

- Assist in developing a volunteer list to help in debris clearance issues.
- (to be developed)

4.3.2 _____ Voluntary Organizations Active in Disasters (___VOAD) will:

- Assist in developing a volunteer list to help in debris clearance issues.
- (to be developed)

4.3.3 Volunteer Fire Service will:

- Assist as necessary in emergency roadway clearance and public right-of-way clearance.
- Coordinate with local utility companies during emergency roadway clearance and public right-of-way clearance operations.
- If possible, assist in HHW assessment and/or clearance.
- (to be developed)

5.0 ADMINISTRATION AND LOGISTICS

5.1 All agencies will document personnel and material resources used to comply with this annex. Documentation will be used to support any Federal assistance that may be requested or required.

5.2 Requests for support and/or assistance will be upchanneled from the local level to the county level EOC and then up to the State EOC. Requests for Federal assistance will be made by the State EOC through established procedures as outlined in the Federal Response Plan.

5.3 All agencies will ensure 24-hour staffing capability during implementation of this annex if the emergency or disaster requires.

5.4 __EMA, in coordination with __DOT and __NREC will be responsible to initiate an annual update of this annex. It will be the responsibility of each tasked agency to update their respective portion of the annex and ensure any limitations and shortfalls are identified, documented, and work-around procedures developed if necessary.

6.0 AUTHORITIES AND REFERENCES

6.1 To be developed

APPENDICES

- 1 Acronyms and Abbreviations**
- 2 Debris Management Task Force Agencies**
- 3 Debris Modeling**
- 4 Debris Estimates for Incorporated Towns**
- 5 Map of Pre-selected Sites (State, County, Municipal)**
- 6 List of _____ Solid Waste Facilities**
- 7 Sample Documentation (Agreements, Contracts, MOU/MOAs)**
- 8 Demolition of Private Property Checklist**
- 9 Removal of Navigational Hazards Checklist**
- 10 Closure Checklist**

APPENDIX 1

ACRONYMS AND ABBREVIATIONS

USACE	U.S. Army Corps of Engineers
ARC	- American Red Cross
CAP	- Civil Air Patrol
C&D	- Construction and Demolition (debris)
CFR	- Code of Federal Regulation
__DOT	- _____ Department of Transportation
__EMA	- _____ Emergency Management Agency
__VOAD	- _____ Voluntary Organizations Active in Disasters
DMTFG	- Debris Management Task Force Group
__NG	- _____ National Guard
DNREC	- Department of Natural Resources & Environmental Control
__SP	- _____ State Police
DSR	- Damage Survey Report
__SWA	- _____ Solid Waste Authority
EOC	- Emergency Operations Center
EPA	- Environmental Protection Agency
ESF	- Emergency Support Function
FCO	- Federal Coordinating Officer
FEMA	- Federal Emergency Management Agency
HHW	- Household Hazardous Waste
IA	- Individual Assistance
MOA	- Memorandum of Agreement
MOU	- Memorandum of Understanding
PA	- Public Assistance
QA	- Quality Assurance
SCO	- State Coordinating Officer
SOW	- Scope of Work (contract)
USDA	- U.S. Department of Agriculture

APPENDIX 2

DEBRIS MANAGEMENT TASK FORCE

Core Agencies

<u>Agency</u> <u>Number</u>	<u>Point of</u> <u>Contact</u>	Telephone
_____	Emergency Management Agency	
_____	National Guard	
_____	Solid Waste Authority	
	Department of Administrative Services	
	Department of Natural Resources & Environmental Control	
	Department of Transportation	
	County Emergency Management	
	County Emergency Management	
	County Emergency Management	

APPENDIX 3

DEBRIS MODELING

The modeling methodology described below was developed by the U.S. Army Corps of Engineers Emergency Management staff using actual data from Hurricanes Frederick, Hugo, and Andrew. The estimates produced by the model are predicted to have an accuracy of + or - 30 % (accuracy is limited due to the many variables inherent to the debris removal process). The primary factor the model utilizes to estimate storm generated debris is the total number of households in a developed urban/suburban area. Other factors utilized are cubic yards of debris generated per household per storm category, vegetative cover, commercial density, and precipitation. The household debris includes debris generated from damage to the house including contents and surrounding shrubs/trees. Vegetative cover includes all trees/shrubbery and other debris located on public rights of way. Commercial density includes debris generated by damage to businesses and industrial facilities. The majority of commercial related debris will be removed by private contractors; however, disposal/reduction space is still required. The amount of precipitation generated by a storm has a direct relationship on debris quantities. Very wet storms will cause ground saturation increasing tree fall.

For planning purposes, the worse case scenario should be used, one storm category for the subject area. For actual events the wind speeds will vary and more accurate debris estimates can be determined by detailed analysis. The most accurate process is to determine the defined areas by using Doppler Radar (National Weather Service Broadcasts) and GIS (Geographical Information Systems). The Doppler radar will define the storm's intensity and the exact track of the "eye" of the storm in relation to the affected area. By tracking the storm and plotting the eye path and 5 mile wide bands out from the eye, defined areas and estimated wind speeds can be determined. The wind speed of the eye wall normally determines the reported storm category with the outward or five-mile bands being a lesser category. The storm then can be tracked inland until the wind speeds dissipate below hurricane strength. The areas now outlined can be divided by storm category. Once divided, coordinates can be entered into GIS to determine areas and demographic information such as population, schools, businesses required by the model to calculate debris quantities.

ESTIMATING DEBRIS QUANTITIES

Determine population (**P**) in the affected area (for example, 1990 census data for the Harrison County, MS. is 165,000). Therefore, for Harrison Co, **P** = 165,000. Population density per square mile can also be used to determine debris estimates per square mile. The assumption of three persons per household (**H**) is used for this model. Known/estimated population (**P**) for a jurisdiction may be used to determine a value for **H**. $H = P / 3$. The formula used in this model will generate debris quantity as an absolute value based on a known/estimated population or as a debris quantity per square mile based upon population density per square mile. The model formula is as follows:

$$Q = H (C) (V) (B) (S)$$

where **Q** is quantity of debris in cubic yards.
H is number of households = Population / 3.
C is a storm category factor in cubic yards (cy).
V is a vegetation characteristic multiplier.
B is a commercial/business/industrial use multiplier.
S is a storm precipitation characteristic multiplier.

Storm category factor (C). It expresses debris quantity in cubic yards (cy) per household by hurricane category and includes the house and its contents, and land foliage.

<u>Hurricane Category</u>	<u>Value of C Factor</u>
1	2 cy
2	8 cy
3	26 cy
4	50 cy
5	80 cy

Vegetation multiplier (V). It acts to increase the quantity of debris by adding vegetation including shrubbery and trees on public rights-of-way.

<u>Vegetative Cover</u>	<u>Value of V Multiplier</u>
Light	1.1
Medium	1.3
Heavy	1.5

Business/commercial/industrial multiplier (B). It takes into account areas which are not solely single-family residential, but includes small retail stores, school, apartments, shopping centers and light industrial and manufacturing facilities. Built in to this multiplier is the offsetting commercial insurance requirement for owner/operator salvage operations.

<u>Business Density</u>	<u>Value of multiplier</u>
Light	1.0
Medium	1.2
Heavy	1.3

Precipitation multiplier (S). It takes into account either a “wet” or “dry” storm event. With a “wet” storm, trees will up-root generating a larger volume of storm generated debris (for Category 3 or greater storms only).

<u>Precipitation Characteristics</u>	<u>Value of Multiplier</u>
None to light	1.0
Medium to heavy	1.3

Example: A category 4 storm passes through Harrison County Mississippi. The area is primarily single family dwellings with some apartment complexes, schools and shopping centers. Vegetation characteristic is heavy due to the proliferation of residential landscape, shrubbery and trees throughout the area. The storm is a very wet storm with rain before and continuing for a few days after the wind passes.

Q = H (C) (V) (B) (S)

H = P / 3 (persons per household)= 165,000 / 3 = 55,167

C = 50 (factor for a Category 4 storm)

V = 1.5 (heavy vegetation)

B = 1.3 (heavy commercial due to schools/stores/apartments)

S = 1.3 (wet storm event)

DEBRIS REDUCTION SITE REQUIREMENTS

Current Army Corps guidance for debris reduction (storage/handling) sites is to estimate stack heights of 10 feet with 60 % usage of land area to provide for roads, safety buffers, burn pits, HHW areas, etc.

1 acre (ac) = 4,840 sq yd (sy)

10 feet stack height = 3.33 yards

Total volume per ac = 4,840 sy / ac (3.33 y) = 16,117 cy / ac

From the example above, the acreage required for debris reduction sites is:

7,000,000,000 cy/ 16,117 cy/ac = 434 acres required for debris storage only, no buffers.

To provide for roads, buffers, etc., the acreage must be increased by a factor of 1.66 or divided by 60 %.

434 acres (1.66) = 720 acres. Or since 1 square mile (sm) = 640 acres

720 acres / 640 ac / sm = 1.12 square miles.

If you assume a 100 acre reduction site can be cycled every 45 to 60 days or one time during the recovery period, then, $720 / 2 = 360$ acres or four 100 acre sites would be required. The number of sites varies with size, distance from source, speed of reduction (mixed debris is slower than clean woody debris) and removal urgency. If existing landfill space is not readily available to start reducing site volumes immediately, additional sites will be required. Public owned property should be considered first, then predesignated leases with landowners as an alternative. Predesignation of sites is critical to expediting initial debris removal operations.

The Army Corps commonly removes approximately 70 % of the total volume generated with local governments, volunteer groups, and private individuals removing the remainder. If 7 million cy is estimated, the Corps could estimate removing approximately 70 % or 4.9 million cy.

The debris removed will consist of two broad categories, clean woody and construction and demolition (C&D) debris. The clean debris will come early in the removal process as residents and local governments clear yards and rights of ways. The debris removal mission can be facilitated if debris is segregated as much as possible at the origin, i.e. along the Right of Way, according to type. The public should be informed regarding debris segregation as soon as possible after the storm. The most effective process is to set time periods for removal, i.e., the first 7-10 days clean woody debris only, then followed by all other debris, segregating the metals from the non metals.

Most common hurricane generated debris will consist of the following:

- 30 % Clean woody debris

- 70 % Mixed C&D. Of the 70 % mixed C&D,

- 30 % Burnable but requires sorting,
- 2 % Soil,
- 10 % Metals,
- 28 % Landfilled.

Based on the example above, 7,000,000 cy would break down as follows:

- 2,100,000 cy Clean woody debris

- 4,900,000 cy Mixed C&D. Of the 4,900,000 cy of mixed C&D,

- 1,470,000 cy Burnable but requires sorting or landfilling

- 98,000 cy Soil,
- 490,000 cy Metals,
- 1,372,000 cy Landfilled.

Burning will produce about 95 % reduction. Of less environmental concern than burning is the use of chippers and/or tub grinders. The chips/mulch produced has agricultural value as well as being easily converted to pelletized fuel. Chipping and grinding reduces the debris volume on a 1 to 4 ratio (4 cy is reduced to 1 cy) or by 75 %. The rate of burning versus chipping/grinding is basically equal, about 200 cy / hr. However chipping requires on-site storage and disposal of the chips/mulch.

(Point of contact for questions pertaining to this model is Mr. Allen Morse, (334) 690-2495.)

APPENDIX 4

DEBRIS ESTIMATES FOR INCORPORATED TOWNS

Appendix 4.1 _____ **County Estimates**

Appendix 4.2 _____ **County Estimates**

Appendix 4.3 _____ **County Estimates**

APPENDIX 4.1

DEBRIS ESTIMATES FOR INCORPORATED TOWNS

_____ County

Town	Population ¹	Debris Quantity ² Q = cubic yards (cy)	Debris Storage Acreage Conversion Guide ³

¹Bureau of the Census Population Estimates of the Total Resident Populations for _____ Counties, and Incorporations.

² See Appendix 3 for explanation of Debris Modeling.
 $Q = (H) (C) (V) (B) (S) = (\text{Population}/3) (26\text{cy}/\text{Household}) (1.3) (1.2) (1.3)$
 Assumptions: 3 persons per household (H) = Population/3
 Cat 3 Storm (C) = 26 cubic yards per household
 Medium Vegetative Coverage (V) = 1.3
 Medium Commercial Density (B) = 1.2
 Medium to Heavy Precipitation (S) = 1.3

³ Assumption: Debris stacked 10 feet high

³ Assumption: Debris stacked 10 feet high

APPENDIX 4.3

DEBRIS ESTIMATES FOR INCORPORATED TOWNS

_____ **County**

[illegible]

¹ Bureau of the Census Population Estimates of the Total Resident Populations for _____ Counties, and Incorporations.

² See Appendix 3 for explanation of Debris Modeling.

$Q = (H) (C) (V) (B) (S) = (\text{Population}/3) (26\text{cy}/\text{Household}) (1.3) (1.2) (1.3)$

Assumptions: 3 persons per household (H) = Population/3

Cat 3 Storm (C) = 26 cubic yards per household

Medium Vegetative Coverage (V) = 1.3

Medium Commercial Density (B) = 1.2

Medium to Heavy Precipitation (S) = 1.3

³ Assumption: Debris stacked 10 feet high

APPENDIX 5

MAPS OF PRE-SELECTED SITES

**Pre-selected sites being determined by the DMTF
Maps to be developed after sites are determined**

APPENDIX 6

LIST OF _____ SOLID WASTE FACILITIES

(Included as an attachment on the next _____ pages)

APPENDIX 7

SAMPLE DOCUMENTATION

Mutual Aid Agreement

Right of Entry Agreement

Time and Material Contract

Lump Sum Contract

Unit Price Contract

Memorandum of Agreement

Memorandum of Understanding

APPENDIX 8

DEMOLITION OF PRIVATE PROPERTY CHECKLIST

DOCUMENTATION

- Provide a letter to FEMA that sets forth the nature of the city/county ownership or interest in the buildings to support their authority for demolition. This action is only for publicly owned buildings.
- Provide a copy of all ordinances that authorizes the city/county to condemn privately owned structures. The authority to condemn privately owned structures would probably have to be accomplished by an ordinance other than one designed or enacted for the demolition of publicly owned structures.
- Provide a copy of the local government's resolution with appropriate recitals required to support adoption/enacts of ordinances of other local laws, required to condemn, demolish and remove public buildings. Public Law 93-288, as amended by Public Law 100-707, authorizes the demolition of public structures that are rendered "unsafe and endanger the public." It is essential that the city make a declaration of such findings as it specifically applies to each building to be demolished/removed.
- The city/county resolution should comply with Public Law 93-288. The city/county should agree to provide, without cost to the Federal Government, all lands, easements and rights-of-way necessary for the accomplishment of the approved work; and hold and save the Federal Government free from damages due to the requested work. and shall indemnify the Federal Government against any claims arising from such work.
- Implement laws that reduce the time it takes to go from condemnation to demolition.
- Provide copies of all applicable permits required for demolition of subject structure(s).
- Provide copies of pertinent temporary well capping standards.
- Designate and authorize a representative to provide to the Federal Government with rights-of-entry.
- Provide executed right-of-entry and hold-harmless agreements that have been signed by the owner (and by renter if rented). Right-of-entry should indicate any known owner intent to rebuild (to ensure foundation and utilities are not damaged.) If these agreements are not executed, document reason(s).

- Give notice to property owners and their tenants (renters) to removal personal property in advance of demolition.
- Document name of owner on the title, the complete address and legal description of the property; and the source of this information. Document name of renter if available.
- Ensure property will be vacated by demolition date.
- Provide a list that clearly and completely describes the structures designated for demolition. Additionally, provide a list that also identifies related structures, trees, shrubs, fences, and other items to remain on the respective property. Give written notice to property owners of the proposed demolition and scope of demolition (structures, outbuildings, fences, trees, shrubs).
- Notify mortgagor of record.
- Provide the property owner the opportunity (public meeting, newspaper ad, radio, letter) to participate in decision on whether the property can be repaired.
- Determine the existence and amount of insurance on the property prior to demolition.
- Identify historic properties. Demolition or repair of these properties should be handled by the Damage Survey Report (DSR).
- Specify procedures to determine when cleanup of a property is completed.

INSPECTION

- Coordinate all pertinent site inspections with the Federal Government's inspection team(s). Identify HHW materials prior to demolition.
- Notify the owner and/or renter of any and all site inspections.
- Verify that all personal property has been removed from public and/or private structure(s).
- Verify that the building is unoccupied immediately prior to demolition.
- Ensure that the property is properly posted.
- Provide a clear, concise and accurate property description and demolition verification.
- Include a Public Health official on demolition inspection teams.

- Inspection criteria shall be based not only on structural integrity of building, but also must demonstrate “imminent and impending peril” to public health and safety.
- Segregate all HHW materials to a permitted facility prior to building demolition.
- Provide photographs of the property and verify the address. Provide additional photographs of the property taken immediately prior to and immediately after demolition.

UTILITIES

- Locate, mark, turn off, and disconnect all water and sewer lines.
- Locate, mark, turn off, and disconnect electrical service.
- Locate, mark, turn off, and disconnect gas service.

APPENDIX 9

REMOVAL OF NAVIGATIONAL HAZARDS CHECKLIST

1. Coordinate with U.S. Coast Guard, State Marine Patrol, local government agencies and legal counsel.
2. Inspect marinas in order to locate debris. Inspections can be done visually by helicopter or boat, via side-scan sonar, or via diving.
3. Use Global Positioning System (GPS) survey methods to pinpoint location of sunken debris.
4. Keep a log that reflects an accurate count of debris items with corresponding locations.
5. Record the vessel registration number.
6. Photograph the wreckage.
7. Provide notification by certified letter to private owners of impending vessel removal. This should be performed in accordance with legal constraints.
8. Provide the owner an opportunity to remove the vessel prior to Federal Government initiation of debris removal.
9. Provide public notice in local newspapers.
10. Generate scopes of work based on items to be removed or time and materials.
11. Maintain flexibility due to problems inherent to work in areas influenced by tidal conditions. Other problems can occur as a result of wreckage removal by others prior to the issuance of a "Notice to Proceed" contract. Flexibility in contract execution can be achieved by issuing an equipment rental type contract. Fixed price contracts with each piece of debris indicated as a line item are not recommended. Incorporate appropriate regulatory concerns, and/or applicable State laws.
12. Maintain continuous communication with local and state authorities.
13. Continually verify the number and locations of sunken vessels.
14. Remove or replace defective buoys.

15. Require a bill of sale or a vessel registration be presented to the USACE representative on site if an individual claimed a vessel during removal operations.
16. Ensure that accurate records are maintained.
17. Ensure that contracts and cleanup schedule incorporate tidal constraints. Debris located in shallow areas may be inaccessible to contractor equipment during low tides.
18. Ensure that contracts include salvage rights to the contractor.

APPENDIX 10

CLOSURE CHECKLIST

(Narrative responses may be required and closure documents included.)

Site Number and Location.

Date Closure Complete.

HHWs.

Contractor Equipment and Temporary Structures.

Contractor Petroleum and HHW Spills.

Ash Pile.

Other.

Appendices.

Contracting Status Reports.

Contract.

Testing Results.

Correspondence.